

Abstract Submitted to the
International Conference on Strongly Correlated Electron Systems
University of Michigan, Ann Arbor
August 6-10, 2001

Magnetic and electrical properties of the $\text{UCu}_4\text{Al}_{8-x}\text{Ga}_x$

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The discovery of heavy-fermion-like behavior in $\text{UCu}_x\text{Al}_{12-x}$ has arisen the interest in the properties of its derivatives. Up to now only the systems in which the 3d transition metals were substituted for Cu, were investigated. In this report, for the first time the substitution in the Al sublattice is presented. $\text{UCu}_4\text{Al}_{8-x}\text{Ga}_x$ system exists in limited concentration range with $x \leq 2.0$ crystallizing in the tetragonal ThMn_{12} -type of structure with the lattice parameters decreasing as the Ga concentration, x , is increasing. Magnetic susceptibility follows modified Curie–Weiss law above $\approx 100\text{K}$ and respective parameters do not change clearly with composition. The Néel point decreases slightly with the Ga concentration. It is seen that the substitution in the Al sublattice does not influence strongly the magnetic properties of investigated alloys. The electrical resistivity of the alloys decreases with increasing temperature exhibiting diffuse maximum at low temperatures, fairly close to the Néel point.

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